# Impact of high-performance work practices on efficiency and effectiveness of multispecialty healthcare service delivery in an emerging economy – role of relational coordination

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# Impact of High-Performance Work Practices on Efficiency and Effectiveness of Multispecialty Healthcare Service Delivery in an Emerging Economy – Role of Relational Coordination

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## Abstract

Healthcare institutions have been working to improve the efficiency and effectiveness of the service delivered. Literature has argued that their capabilities have a direct effect on service outcomes. Research has explained how their capabilities can be enhanced by implementing high-performance work practices (HPWP) bundles and how these bundles can impact performance through relational coordination. However, this previous research has focused primarily on single-specialty healthcare institutions in a developed country. Inherent characteristics of multi-specialty healthcare institutions (e.g. inability to standardize) and emerging economy context (e.g. absence of case manager role) motivate further investigation in this setting. Therefore, in our research, we study the impact of HPWP on overall performance, efficiency, and effectiveness of healthcare service delivered and how this linkage is moderated by relational coordination. We analyzed 605 valid responses from different healthcare institutions located in the southern Tamil Nadu state of India using structural equation modeling. In alignment with past research, our results show that HPWP improves the overall performance and effectiveness, and this linkage is moderated by relational coordination. However, HPWP's impact on efficiency and its moderation by relational coordination is insignificant. We explain the results by anchoring them to the characteristics of multi-specialty and emerging economy context.


## Managerial Statement

We offer two interesting implications to managers of healthcare institutions. Firstly, we extend the understanding of the impact of High-Performance Work Practices (HPWP) and relational coordination on efficiency and effectiveness from a single-specialty healthcare setting to multi-specialty healthcare institutions. Our results indicate to practitioners the outcome HPWP is capable of achieving and whether this outcome is enhanced and diminished by relational coordination. More precisely, our results show that the relationship between HPWP and effectiveness and HPWP and overall performance is moderated by relational coordination. However, the relationship between HPWP and efficiency when moderated by relational

coordination is insignificant. Secondly, we identify the characteristics of healthcare institutions in the emerging country context such as absence of case manager role, collectivist culture, recruitment constraints, and weakly developed governance mechanisms, and capture how they can potentially influence the relational coordination and thereby the impact of HPWP on effectiveness and efficiency. We expect this understanding to help healthcare practitioners in emerging economy context to extract the maximum of HPWP implementation and relational coordination embracement.

**Keywords:** High-performance work practices; Relational coordination; Effectiveness; Efficiency; Multispecialty Healthcare Service Delivery; India.

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## 1. Introduction

According to a viewpoint published in *Public Health Reports* journal in 2004, "the present healthcare system is neither effective nor efficient" [1]. Both the World Health Organization (WHO) and the Organisation for Economic Co-operation and Development (OECD) expressed their concerns over inefficiencies in the health system till the current days [2], [3], and advocate the need for care coordination [4]. Many recent publications are still investing their attention to investigate this universal problem in healthcare service delivery [5], [6] and thereby approve the relevance of this claim even today. Healthcare institutions[1] have been continuously working to improve the efficiency and effectiveness of the healthcare service delivered [7]. Healthcare institutions measure the efficiency of healthcare service as the length of stay of the patient for treatment. Efficient care delivery focuses on optimizing the usage of resources to reduce the overall incurred cost. The effectiveness of healthcare service delivered is measured as the degree of satisfaction perceived by the patients. Effective care delivery is only attainable by delivering focused, personalized, and patient-centric quality care, which in turn, translates into patient satisfaction [8].

In the context of healthcare services, the main reasons attributed for this efficient and effective attainment challenge are high resistance to change, lack of knowledge on other functional domains related to healthcare, rigidity in the division of labor for physicians and employees throughout the healthcare system, difficulty in monitoring the care delivery process, absence of the standard level of care, and complexity involved in care delivery. Some of the

[1] Healthcare institutions or service providers is a broad term encompassing health clinics, nursing care centers, multi-specialty hospitals, super-specialty hospitals, hospices, etc. Health professionals employed in these healthcare institutions include the physicians, nurses, pharmacists and allied health workers.

initiatives taken by healthcare institutions to achieve both efficiency and effectiveness are standardization, training, and knowledge transfer, systems thinking, design thinking, process management, use of electronic medical records, variance minimization, etc. [5], [6], [9].

Healthcare service providers (HCSP) are an important resource of a healthcare institution as they play a significant role in delivering efficient and effective service to patients [10]. Patients and their families evaluate the healthcare institution solely based on the interaction they have with HCSP. Physicians, nurses, nursing assistants, technicians, pharmacists, and receptionists are the representatives of HCSP. Healthcare institution has to carefully recruit and embrace its HCSP as they play a very important role on the care delivered and how patients perceive the care delivered, and thereby form the competitive advantage of a healthcare institution. For instance, the most value-adding component of healthcare service is delivered in a closed-setting where the physician and patient interact with each other for a relatively very short period of time. The information collected for assessing the patient in this setting is contextualized to the encounter and is subject to bias. Additionally, in healthcare service delivery, patients are not in a position to objectively evaluate the service delivered. These characteristics of healthcare service delivery make the achievement of efficiency and effectiveness completely dependent on the capabilities of HCSP.

According to Holman and Lorig, (2004), addressing the issue of being neither effective nor efficient in healthcare service delivery requires a transformation of healthcare processes and revision of the roles and responsibilities of HCSP to improve their capabilities. As the capabilities of HCSP have a direct effect on achieving efficiency and effectiveness in healthcare service delivery, it is of utmost importance for healthcare institutions to develop and implement bundles of contemporary human resource management practices. These practices, which are often called high-performance work practices (HPWP) [11], [12], increases the capabilities of HCSP and in turn, increase the efficiency and effectiveness of healthcare service

delivered to patients. Yet, the investigation of the impact that HPWP can have on the efficiency and effectiveness of healthcare service delivered, has not received the required attention. Therefore, it would be interesting to evaluate the potential of HPWP as a tool in a collectivist culture context for enabling healthcare organizations to achieve both efficiency and effectiveness.

In addition, the existence of relational coordination among health professionals and patients has been shown to form ties in a work process to improve the efficiency and effectiveness of the outcome in different studies described below. Relational coordination between HCSP and patients, which is measured using the communication and information sharing ties, can be expected to not only impact the patient satisfaction and loyalty (i.e. effectiveness) but also affect the length of stay through the quality of clinical treatment delivered (i.e. efficiency) (Dennis et al., 2007; Gaur et al., 2011). Finally, the impact of HPWP on efficiency and effectiveness varies depending on the level of relational coordination (communication and information sharing) achieved between HCSP and patients. By anchoring to this motivation, we attempt to answer the following three research questions in this study:

**RQ1:** What is the impact of HPWP on the efficiency and effectiveness of healthcare service delivered?

**RQ2:** What is the impact of relational coordination (both information and communication) on the efficiency and effectiveness of healthcare service delivered?

**RQ3:** How will relational coordination change the impact of HPWP on the efficiency and effectiveness of healthcare service delivered?

For this research, we modified Gittell's healthcare framework [15] according to the healthcare network in emerging economies (Indian context) to check the effectiveness and efficiency parameters considering relational parameters as moderator. Our rationale for including relational parameter as the moderator are as follows: i) In emerging economy

scenario - care providers do have a collectivist culture where the casual relationship between HPWP and performance outcome is not homogenous for the whole population, ii) relational coordination is uncorrelated with HPWP and iii) relational coordination is a trait and enduring process in the emerging economy context. We collected 605 valid responses from HCSP of four multi-specialty hospitals located in the southern Tamil Nadu state of India. We performed the statistical analyses on the data collected using structural equation modeling (SEM) to empirically test the conceptual model. Our results show that relational coordination moderates the relationship between HPWP and effectiveness, and HPWP and overall performance. However, relational coordination has an insignificant moderation effect between HPWP and efficiency. We discuss the implications of these findings for research and practice.

The rest of the paper is organized as follows: Section 2 describes the review of the pertinent literature and about the research gap findings, Section 3 explains different theoretical lenses through which can aid to address the research questions and to develop the hypotheses, Section 4 describes the research methodology, Section 5 discusses the results obtained from PLS-SEM and its analysis considering measurement parameters. Section 6 discusses the results of the hypotheses. The last section is the conclusion of the study followed by research and practical implications with a note on limitations of the current study and future suggestions.

## 2. Literature Review

In this section, we summarize the literature investigating the attainment of efficiency and effectiveness in healthcare service delivery. Following it, we also draw support from literature to highlight the importance of HPWP and relational coordination in general and in the context of healthcare service delivery.

### 2.1. Efficiency and Effectiveness in Healthcare Service Delivery

Efficiency and effectiveness have always been considered two key performance measures and in the supply chain context [16] and can be extended to be equally important in the case of health service operation. Different healthcare providers including physicians, nurses, pharmacists, technicians, and medical assistants have to work in synchronization for delivering effective and efficient health service in a healthcare provider institution. Effectiveness and efficiency of healthcare service are the main measures in selecting a healthcare provider and every healthcare provider has a strategic priority to improve these two measures [17]. Efficiency is measured by the length of stay for the health service and effectiveness refers to the degree of satisfaction perceived by the patients [7], [18]. Gittell et al. (2000) studied nine different healthcare providers across the United States and investigated upon coordination between healthcare workers (i.e. physicians, nurses, social workers, case managers, and physical therapist) to capture efficiency and effectiveness using three metrics (i.e. improved quality of care, reduced cost of operative care, and decreased length of stay). Empirical evidence of the effectiveness in the context of hospitals and paramedical organizations by analyzing the relationship of integration and quality can be found in the study conducted by Chadha and Gagandeep (2013).

Structural changes in an organization can improve care coordination and accountability among the healthcare personnel, which positively impacts the health status of the patient or the community [21]. For instance, researchers advocated that the structural empowerment of the nurses can result in improved effectiveness of high-quality care [22]. Across twelve healthcare providers in North America, Goedhart et al., (2017) conducted the cross-sectional study and found that if access to empowering structures is provided to the nurses, it bolsters positive outcomes for both efficiency and effectiveness, which resulted in patient-centered care in the

hospitals. Efficiency and effectiveness of a healthcare organization although studied in separate for different health professionals and in conjunction with structural empowerment of nurses, an inclusive study that considers health professionals from both the front line and backend of the health service delivery and integrates HPWP is absent.

### 2.2. Importance of High-Performance Work Practices

HPWP can be described as human resource management practices that enhance the performance of an organization through augmenting employee competencies, commitment, motivation, and productivity. These HPWP aids to raise employee performance, which finally leads to better organizational performance [11], [12].

Different empirical and meta-analysis studies have shown that HPWP plays a pivotal role in positive employee and organizational outcomes. Also, Bayo-Moriones and Merino-Díaz de Cerio, (2001) found a positive association between HPWP and quality management practices in a study covering samples from a thousand Spanish manufacturing plants. This is consistent with findings of Gollan et al., (2014) in an Australasian medical device manufacturing facility that HPWP resulted in better organizational output. Macky & Boxall, (2007) studied the effect of HPWP on employee attitude (i.e. job satisfaction, trust in management, and organizational commitment) by considering a nationally representative population of all registered urban electors of working age in New Zealand who were neither self-employed, members of the clergy, in the armed forces, or a beneficiary of the state. They found that HPWP practices have a positive relationship with employee satisfaction and attitude variables and aid to create a win-win environment for both employees and employers. The research argues that HPWP is found more relevant in boosting employee satisfaction and organizational performance in the manufacturing industry [26]. HPWP augmented employee satisfaction and resulted in a lower turnover in the service sector employees as well [27]. In the

research studies which considered respondents from specific industries, HPWP is found to be positively associated with the employee-earning and satisfaction in the steel, and apparel industry [28].

In the healthcare services domain, analysis of data collected from multiple hospitals from the United States and England suggested that hospitals with HPWP provide higher-quality care. One study illuminated that if hospital boards adopted HPWP, front line managers, and hospital staff delivered quality health services that had been captured by the clinical quality metrics [29]. Fan et al., (2014) investigated the impact of HPWP on subjective well-being and workplace burnout. This study covers twenty-five Chinese hospitals by collecting responses from physicians and nurses. HPWP augmented the subjective well-being of the health personnel and attenuated workplace burnout, which is overall buttressed in the fact that opting for HPWP in a healthcare service organization is beneficial for its employees. To understand how HPWP positively affects performance outcome in a healthcare provider organization, Gittell et al., (2010) collected responses from medical staffs of the nine orthopedics units and suggested that the positive association of performance outcome and HPWP is mediated by relational coordination of the health service delivery personnel (nurse, physician, physical therapist, social workers, and case managers).

HPWP improves satisfaction for both health professionals employed in a hospital and the patients seeking care in the hospital. It decreases the burn-out in HCSP and as a result, increases the effectiveness and performance of the organization. Meanwhile, it is true that patient satisfaction and quality is a necessary objective while delivering health service, but from the perspective of a healthcare provider, maintaining efficiency is equally important. Till now, the influence of HPWP parameters and their relationship with efficiency is yet to be investigated. The performance of health care delivery depends on how well the complex coordination between different HCSP is managed. Efficient care delivery is possible only

through the coordination of such a diverse and large workforce with different professional responsibilities. Such well-coordinated large professional groups translate into a successful healthcare provider [31]. However, the question of whether the relationship between HPWP and effectiveness or efficiency is moderated by the relational coordination of the health professionals in any multi-specialty hospital is yet to be investigated.

### 2.3. Importance of Relational Coordination

Whereas initial studies that explored the coordination and integration between different HCSPs [32] and with hospital's partner organization, among different professionals as a team in healthcare settings [33] and software development industry [34] either emphasized on 'relational angle' or focused on relational aspects of other theories such as social capital theory; a deeper insight leads an investigation of HCSP coordination using the lens of relational coordination [35]. Relational coordination is a mutually reinforcing process of communicating and relating to the purpose of task integration. Relational coordination is a research model that captures the relational dynamics of coordinating work inside the organizations [7]. Gittell (2002b) utilized this theory to explain the phenomena of improved performance in the context of patient care by the interaction of health personnel and patients. Recent articles either extend the idea that relational coordination between HCSP workgroups improves patient satisfaction [36] or explores the possibility of HCSP coordination using technologies [37] such as e-health record introduction in the hospitals [38]. The idea of relational coordination is based on the interactive nature between both relationships and communication in the business environment. Relational coordination can be used for measuring and analyzing the communication and relationship networks through which work is coordinated across functional and organizational boundaries.

Relational coordination theory makes visible the social processes, human interactions, which underlie the technical process of coordinating complex work. It describes the management of task interdependencies [39]. Relational coordination theory starts by conceptualizing the coordination of work as taking place through a network of relationships among participants in a work process. The theory specifies three attributes of relationships that support the highest levels of coordination and performance - shared goals that transcend participants' specific functional goals, shared knowledge that enables participants to see how their specific tasks interrelate with the whole process, and mutual respect that enables participants to overcome the status barriers that might otherwise prevent them from seeing and taking account of the work of others. These three relational dimensions reinforce each other and are also reinforced by specific dimensions of communication that support coordination and high performance, namely frequency, timeliness, accuracy, and, when problems arise, a focus on problem-solving rather than blaming. Succinctly, relational coordination aid an organization to achieve its desired outcomes [40].

The interest of the researchers to understand the effects of relational coordination is growing due to varied reasons. On the one hand, relational coordination helps employees to coordinate effectively which leads to better relationship performance. Researchers argued that the relational explanation is more acceptable than market coordination mechanism concepts in the context of industrial marketing and purchasing groups [41]. Alternatively, on the other side, it is limpid that relational coordination of the health staff especially nurses had a positive impact on patient satisfaction [42]. So, better relational coordination shows a positive outcome for both employees and consumers. Different empirical pieces of evidence thus far suggest that relational coordination predicts a wide range of quality, efficiency, and financial outcomes that are considered important to organizations.

While researchers have argued that incorporation of relational coordination among the different stakeholders is necessary to deduce performance of organizations in operations and supply chain management domain [43], [44], and even referred to a specific business environment such as airline communication network [45]; it was also pointed out that healthcare operations, supply chain and performance issues were much under-explored from a relational lens [46]. Relational coordination aids to provide efficient service and to predict performance outcomes in a healthcare organization [47]. At a healthcare personnel level, relational coordination proved beneficial to create a better team climate and attendance among nurses and physicians [48]. From an empirical study conducted in fifteen nursing homes, it is clear that relational coordination improves both effectivity and job satisfaction among healthcare staff [49]. Also, as relational coordination increases among healthcare staff, cases of hospital-acquired infection and medication errors reported were considerably reduced, which in turn, augmented the quality of the clinical care [50].

Otte-Trojel et al., (2017) suggested that in an implemented health information system context, better relational coordination often eliminate organizational or technological learning-related employee limitations and resulted in more effective service. Patient perception of care is also reported to be enhanced when relational coordination among healthcare workers is observed [52]. The beneficial effect of relational coordination is also noted for accountable care organizations. Both the efficiency and effectiveness of delivered healthcare were improved for accountable care organizations with better coordination [53]. Ramani et al., (2006) investigated the health system of India and identified that bolstering communication, decentralization, awareness, and empowerment of healthcare staff are essential to overcome the challenges of Indian healthcare providers. This indicates the need for coordinated clinical care delivery in India.

Relational coordination of the employees is a good indicator of market coordination, efficiency, and organizational performance across many domains including the healthcare industry. There is also a report on improving effectiveness in accountable care organizations. In the emerging economy, where many job roles like case managers are absent for coordinating a patient case on the hospital floor, it is even more relevant to see how coordination and work practices of the employees can affect organizational performance.

### 2.4. Research gaps

The advancement of technology and an increase in patient's expectations demand healthcare service providers offer both efficient and effective services. However, a successful health service delivery is mainly reliant on the health personnel involved in care delivery. Coordination between health personnel and work practices are often turned out to be an important determinant of effective and efficient health services.

HPWP depends on relational coordination to enhance the efficiency and effectiveness of healthcare service delivered. There is no proven healthcare model to increase both effectiveness and efficiency for healthcare providers. This motivates us to investigate the role of relational coordination as a moderator to enhance the performance of a healthcare provider, especially the effectiveness and efficiency of the delivered health service.

In addition, from the review of pertinent literature, it is evident that communication and coordination deficit in the healthcare personnel may be one of the causes of loss of efficiency and effectiveness in the healthcare service providers. Also, the existence of scant literature related to the improvement of relational coordination among front-line health professionals (physicians, nurses, etc.) and back-end health personnel (pharmacist, technician, etc.) in the hospital context, which serves as another motivation for conducting this study.

Since the previous studies are mainly focused on healthcare providers of the developed countries, it will be interesting to delve deeper into the role of relational coordination in the organizations which are delivering health services to the patients of an emerging economy where organization structure is different for healthcare institutions and job roles like "case managers" are absent. Advancing context-specific understanding warrants a legit gap in the literature [55]. Contextual uniqueness of the emerging economy is expected to impact coordination and collaboration practices which will in turn influence the relationship between HPWP, relational coordination, efficiency, and effectiveness between the healthcare providers.

## 3. Theory and Hypotheses

In primary and super-specialty (oncology) healthcare service providers, relational coordination based managerial frameworks have yielded better outcomes and proven their utility in the organizations [56]. For this study, we adapt the healthcare delivery framework developed by Gittell et al. (2010) for analyzing efficiency and effectiveness after a modification. We exclude the cross-functional boundary spanners because the job description is dynamic in the Indian healthcare industry. This is because job roles like 'Case Manager' is absent in Indian HCSPs and patients are handled by doctor, nurse, nurse assistant, pharmacists, and receptionist. This modified Gittell et al. (2010) framework is termed as "Modified High-Performance Work Practice (MHPWP)" and is detailed in Figure 1.

Additionally, from the review of pertinent literature, it is already clear that HPWP practices increase the satisfaction level of the patients, hence raise the effectiveness. Also, the literature suggests that better practices bolsters more efficient care delivery. However, such studies mainly considered only the nurses as healthcare professionals [22], and capturing modified work practices among different health professionals remains an interesting question to explore. This is essential to test if MHPWP increases the efficiency, effectiveness, and performance of a service provider when we consider all types of health professionals. In reality,

a health service delivery depends on each of these professionals, and accounting for each type of professionals will make the results realistic and generalizable across all hospitals. This motivated us to develop hypotheses *H1, H2, H3*.

*H1*: MHPWP parameters are positively related to the effectiveness outcomes.

*H2*: MHPWP parameters are positively related to the efficiency outcomes.

*H3*: MHPWP parameters are positively related to the overall performance.

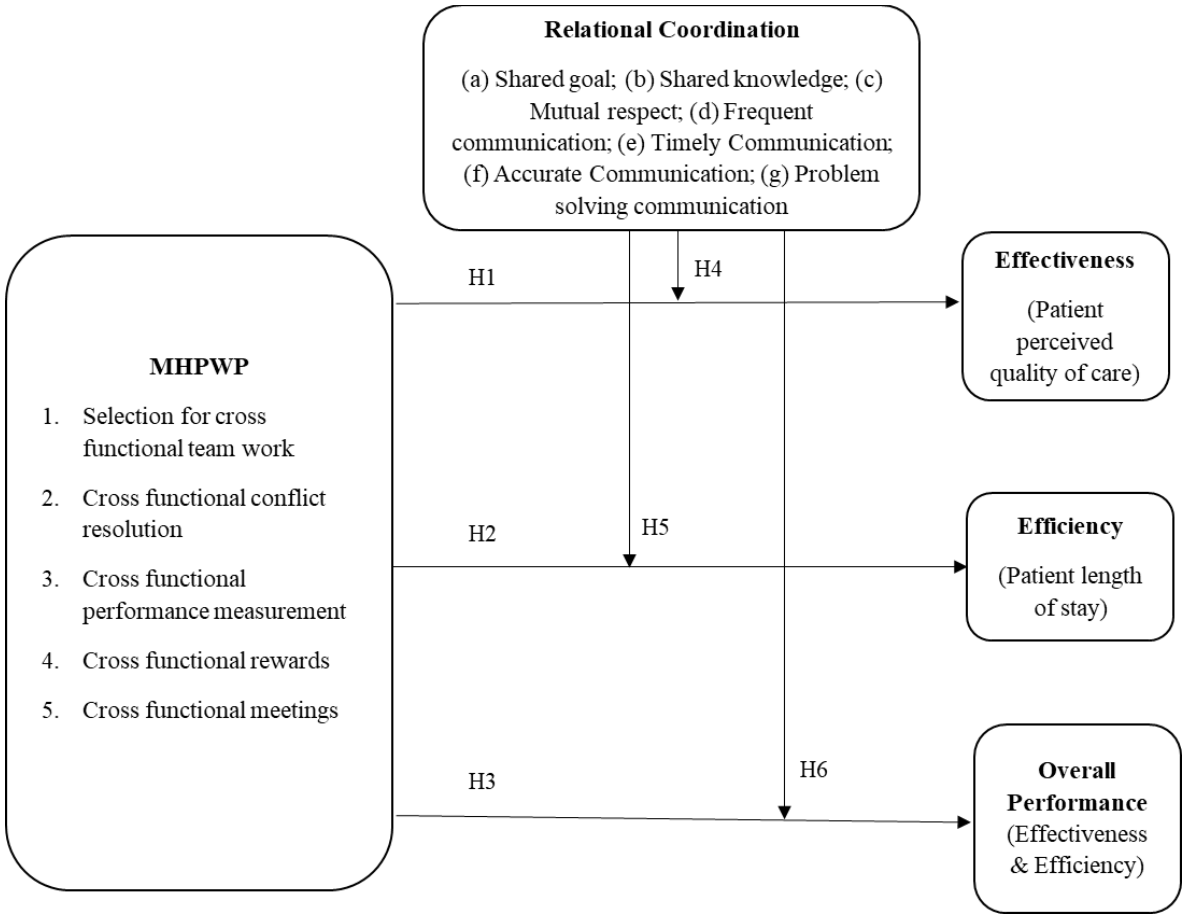


**Figure 1:** Modified High-Performance Work Practices (MHPWP) conceptual model

Intuitively, the coordination of different health professionals should improve the efficiency and effectiveness of a hospital. Previous researchers empirically found that relational coordination positively contributes to efficiency and effectiveness outcomes [47]; its

association with HPWP however, is only investigated for performance outcomes [15]. Also, the specific moderation role of relational coordination for effectiveness and efficiency has not been delved deeper. Although a study reported relational coordination's beneficial influence on both efficiency and effectiveness on a niche type of healthcare organization i.e. accountable care organizations [53]. It is not yet established whether efficiency, effectiveness or quality, and performance outcome (efficiency and quality) are moderated by relational coordination in the context of hospitals or common healthcare service providers which are the mainstream organizations responsible for delivering healthcare services to the patient populations. We develop *H4, H5, H6* to test the moderation effect of relational coordination on MHPWP for providing an efficient and effective service in the context of hospitals.

- *H4*: Relational parameters will positively moderate (increase) the effect of MHPWP on effectiveness outcomes
- *H5*: Relational parameters will positively moderate (increase) the effect of MHPWP on efficiency outcomes
- *H6*: Relational parameters will positively moderate (increase) the effect of MHPWP on overall performance outcomes

## 4. Methodology

### 4.1 Questionnaire Development

To test the hypotheses, we conducted a primary questionnaire-based survey for collecting data from different HCSP. The questionnaire captures five dimensions for MHPWP parameters [15], [57] in thirty-two questions that consists of five questions for Cross Functional Team Work (CFTW), Cross Functional Team Reward (CFTR), Cross Functional Team Meeting (CFTM) and Cross-Functional Conflict Resolution (CFCR), and twelve questions for Cross Functional Performance Meeting (CFPM). For measuring two dimensions of relational coordination [15], [57], we introduced a total of fourteen questions with six of them to address the information-sharing ties and eight of them to address the communication ties. For

measuring the performance outcomes, we used six questions for efficiency and five questions for effectiveness based on Dyer et al., (2012). The questionnaire used in the survey consists of fifty-seven questions (listed in Appendix 1). All the responses are measured using a seven-point Likert scale ranging from '7' as highest (i.e. constantly) to '1' as lowest (i.e. never). To ensure the validity of the instrument, we initially checked the entire questionnaire with the physicians and upon their recommendation, minor modifications in the language of the questionnaire were included.

Further, a pilot study was conducted with forty HCSP and the participated HCSP participated was stretching from physician, nurse, nurse assistant, technician, pharmacist, and administration staff. We included all types of HCSP in the conducted pilot study and an initial survey construct was presented to them. Later, based on the feedback or inputs received from the survey groups regarding the usage of native language, conventional terms, and understandability and we modified the survey constructs accordingly to ensure its validity. These revisions of the pilot survey framework had been performed after a period of 4 months and the duration for actual interviews was 13 months. The results of the pilot study confirmed the validity of the developed questionnaire.

### 4.2 Data Collection

The respondents of the study were randomly selected from four multi-specialty hospitals located in the southern Tamil Nadu state of India. We have collected the data from 680 randomly identified respondents by approaching them individually. These respondents belonging to different departments and different disciplines were conducted on the same day to avoid inducement. Additionally, they were requested no to share survey details with their colleagues to maintain the legitimacy and confidentiality of the survey. Their responses were obtained based on paper and pencil questionnaires after a short personal interview. Our

intention to conduct a personal interview with each respondent was to ensure that they understand the survey items and they are knowledgeable on the topic thus reducing the chance of misunderstanding of the survey questionnaire [59]. We also informed the respondents that they can deny to answer the questionnaire or questions if they feel uncomfortable or not applicable to their context.

Respondent was requested to answer all the questions as per the best of the respondent's ability. This resulted in 625 responses out of which twenty responses had missing data. So, we proceed with 605 valid responses which amount to an 88.97% valid response rate considering our initial respondent selection. These valid responses ensured that we reach every type of HCSP to deliver care in the Indian Healthcare context (i.e. physicians, nurses, nurse assistants, medical technicians, pharmacists, and health administration personnel). The relative and absolute distribution of the collected responses has been tabulated in Table 1.

There are 105 physicians who contributed to this study, and they are from several medical departments *viz.* nephrology, cardiology, neurology, oncology, gynecology, orthopedics, etc. All the survey participants including the physicians were given sufficient information about the importance of the research and survey questionnaire hardcopies were shared afterward. This prior knowledge regarding the significance of the study and their active participation ensured the legitimacy of the survey.

**Table 1:** Study respondent's distribution across the Healthcare industry

| Healthcare Professional | Number of Responses | % of Total Response |
|---|---|---|
| Physician | 105 | 17.36 |
| Nurse | 149 | 24.63 |
| Nurse Assistant | 135 | 22.31 |
| Technician | 111 | 18.35 |
| Pharmacist | 87 | 14.38 |
| Administration Staff | 18 | 2.98 |

### 4.3 Statistical Analysis

We performed statistical analysis on the data collected from all 605 respondents to empirically test the conceptual model by using structural equation modeling (SEM).

### 4.3.1 Structural Equation Modeling

SEM is a widely accepted statistical technique and adopted widely for social, and psychological research. The technique is popular in addressing the business problems that require introspection from a theoretical lens and derived from a social science perspective. SEM aids to decipher relations between observed and latent variables and to test hypotheses related to the variables [60]. Furthermore, SEM tests hypothesized patterns of the direction of the relationships among a set of observed or measured and unobserved or latent variables [61].

### 4.3.2 Partial Least Square Approach

We used the partial least squares (PLS) approach of SEM to demonstrate, estimate, and test a network of relationships among the variables. Firstly, being a second-generation SEM technique [62], PLS helps to develop a model that explicates the causal mechanism and validates empirically the hypotheses by applying predictive oriented measures. Secondly, the PLS-SEM technique doesn't apply stringent assumptions on the latent variable distributions, and analysis can be performed for skewed or normal data obtained from respondents even if they are inter-related [63]. Due to the aforementioned reasons, we found PLS suitable for our model and analyzed it using SmartPLS (V.3.2.6) software.

### 4.3.3 Bootstrapping & Blindfolding

Bootstrapping and blindfolding are both sample reuse techniques. To test the significance of the coefficients, we opted for a bootstrapping approach and with a 5000 resample. Blindfolding, on the other hand, ensures the predictive relevance of the model validation. The

systematic pattern of elimination of data points and prediction in the blindfolding process depends on 'omission distance'. This distance is user-defined and the suggested range is between 5 to 12 [64], [65]. We opted for a value of 7 for our analysis.

## 5. Results

The results are obtained by opting for a partial least square approach and we analyzed the measurement and the structural model simultaneously with SmartPLS (V.3.2.6). All the results are tabulated for a clear understanding and represented in a specific order. Firstly, we explain the measurement model analysis results (PLS algorithm run) followed by the structural model analysis results (bootstrapping run). Secondly, we emphasize the Stone Geisser test ($Q^2$ value) to bolster the predictive relevance of the models. Table 2 documents the results obtained from the analysis and links them to the conceptual model presented in Figure 1.

### 5.1 Measurement Model

We anchored our assessment of the psychometric properties of the scales on several measures. Firstly, the consistency or reliability test of the scales was performed by examining both composite reliability and Cronbach's alpha for all of the measures. The value of composite validity is above 0.6 most of the time for all constructs [66]. Only in one instance, for the measurement model used to test hypotheses 1 and 2, the value of 'effectiveness' is 0.576, which is also close to 0.6. The value for Cronbach's alpha is greater than 0.6 for all the constructs and in some instances, the value is even greater than 0.7, which confirms high internal consistency [67].

Secondly, the convergent validity of the scales is enumerated by examining the factor loading of items and average variance extracted (AVE) for each construct. We observe the AVE values are above 0.4, except for a few exceptions like 'effectiveness' with a value of

0.371 and 'CFPM' with 0.35. This denotes the high convergent validity of the scale [66]. To assess the discriminant validity of the constructs, we analyzed cross-loading values of each construct and found them to be higher than other values. This denotes the high discriminant validity of the constructs [68]. The inter-construct co-relation matrix and descriptive statistics of the construct are given in Table 3.

### 5.2 Structural Model

To test the six hypotheses, we assess the structural model by considering two aspects of the results - coefficient of variation ($R^2$ value) and two-tailed t-test with a significance level of 5% [69]. Table 2 captures these results for each of the hypotheses. Finally, we examined the cross-validated predictive relevance of the model by calculating the Stone-Geisser's $Q^2$ value using the blindfolding approach. For structural models used to test *H1*, *H2*, *H4*, and *H5*, we found $R^2$ to be 0.054, 0.056, 0.077, and 0.062. These values signify that the five latent variables (CFTW, CFTR, CFTM, CFCR CFPM) are weakly explained in the models. However, structural models utilized to test *H3* and *H6* resulted in an $R^2$ value of 0.993 which signifies a strong explanation of variances.

*H1, H2, H3, H4,* and *H6* are supported at a 5% level of significance with a t-statistics value greater than 1.96. From hypotheses *H4* and *H6*, it can be established that relational coordination moderates the relationship between MHPWP and effectiveness, and MHPWP and performance outcomes. From the results, it is clear that *H5* is not supported, which suggests that the moderating effect of relational coordination on the relationship between MHPWP and efficiency is statistically insignificant. However, it is interesting to note that overall performance is the sum of both effectiveness and efficiency and the moderating effect of relational coordination is significant (*H6)*.

Cross-validated predicted relevance of the models can be argued with the light of Stone Geisser $Q^2$ value, which has to be a positive number to denote a successful model candidate. For the models used to test the moderating effect of relational coordination (i.e. *H4, H5,* and *H6),* $Q^2$ values were 0.024, 0.021, and 0.02, whereas models used to test without relational coordination (i.e. *H1, H2,* and *H3)* resulted in $Q^2$ value of 0.018 each. This undoubtedly supports the fact that the cross-validated predicted relevance of the models is within the accepted range as suggested in the existing literature [64], [65].

## 6. Discussion

In this paper, we explored how HPWP impacts the effectiveness and efficiency of healthcare service delivery in the Indian context when moderated by relational coordination. This research makes three key contributions.

First, we have extended the understanding of the impact of HPWP and relational coordination on efficiency and effectiveness from a single-specialty healthcare setting (e.g. Gittell et al. (2010) studied orthopaedics units; Rundal et al. (2016) studied accountable care organizations). In the context of multi-specialty healthcare institutions, our results show that insights from previous literature hold for the relationship between HPWP and effectiveness and HPWP and overall performance moderated by relational coordination. However, the relationship between HPWP and efficiency when moderated by relational coordination is insignificant. Past research has shown that specialization embraces standardization of processes [70] and reduces pressure on the resources of healthcare institutions [71].

**Table 2:** Measurement model and structural model results

| Hypothesis | Hypothesis related to | Measurement Model Analysis (PLS Algorithm Run) | | | | Structural Model Analysis (Bootstrapping Run) | | | Predictive Relevance | Supported / Not Supported |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Reliability Test (consistency) | | Validity Test | | Coefficient of Variation (R2) | t –statistic (5% significance level) | p-value | Stone-Geisser Test (Q2) | |
| | | | | Convergent Validity | Discriminant Validity | | | | | |
| | | Composite Reliability | Cronbach's alpha | Average Variance Extracted (AVE) | Cross loading value | | | | | |
| ***H1*** | Effectiveness | > 0.60 (except effectiveness = 0.576) | > 0.7 | > 0.4 (except CFPM = 0.350 and effectiveness = 0.371) | Higher | $R^2 = 0.054$ | > 1.96 and significant | < 0.05 | 0.018 | Supported |
| ***H2*** | Efficiency | > 0.60 | > 0.70 | > 0.4 (except CFPM = 0.350) | Higher | $R^2 = 0.056$ | > 1.96 and significant | < 0.05 | 0.018 | Supported |
| ***H3*** | Performance outcomes | > 0.60 | > 0.70 | > 0.4 (except CFPM = 0.350) | Higher | $R^2 = 0.993$ | > 1.96 and significant | < 0.05 | 0.018 | Supported |
| ***H4*** | Effectiveness (Moderated by Relational Coordination) | > 0.60 (except effectiveness = 0.576) | > 0.60. | > 0.4 (except CFPM = 0.350 and effectiveness = 0.371) | Higher | $R^2 = 0.077$ | > 1.96 and significant | < 0.05 | 0.024 | Supported |
| ***H5*** | Efficiency (Moderated by Relational Coordination) | > 0.60 | > 0.60 | > 0.4 (except CFPM = 0.350) | Higher | $R^2 = 0.062$ | < 1.96 and insignificant | > 0.05 | 0.021 | Not Supported |
| ***H6*** | | > 0.60 | > 0.70 | | Higher | $R^2 = 0.993$ | | < 0.05 | 0.02 | Supported |

| | | |
|---|---|---|
| Performance outcomes (Moderated by Relational Coordination) | > 0.4 (except CFPM = 0.350) | > 1.96 and significant |

**Table 3:** Descriptive statistics and correlation matrix

| Constructs | Mean | Standard Deviation | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1. CFCR** | 0.261 | 0.015 | 0.64 | | | | | | | | |
| **2. CFPM** | 0.451 | 0.023 | 0.44 | 0.59 | | | | | | | |
| **3. CFTM** | 0.232 | 0.018 | 0.37 | 0.36 | 0.65 | | | | | | |
| **4. CFTR** | 0.231 | 0.019 | 0.40 | 0.30 | 0.38 | 0.66 | | | | | |
| **5. CFTW** | 0.239 | 0.017 | 0.32 | 0.31 | 0.32 | 0.30 | 0.68 | | | | |
| **6. Effectiveness** | 0.243 | 0.035 | 0.15 | 0.15 | 0.17 | 0.21 | 0.14 | 0.61 | | | |
| **7. Relational Coordination** | 0.166 | 0.045 | 0.37 | 0.40 | 0.37 | 0.34 | 0.35 | 0.22 | 0.64 | | |
| **8. Efficiency** | 0.248 | 0.034 | 0.22 | 0.16 | 0.12 | 0.20 | 0.12 | 0.51 | 0.20 | 0.64 | |
| **9. Performance** | 0.260 | 0.034 | 0.20 | 0.17 | 0.14 | 0.22 | 0.15 | 0.84 | 0.21 | 0.89 | 0.6 |
| **Cronbach's Alpha** | | | 0.64 | 0.77 | 0.65 | 0.67 | 0.71 | 0.58 | 0.74 | 0.72 | 0.76 |
| **Average Variance Extracted (AVE)** | | | 0.41 | 0.35 | 0.42 | 0.43 | 0.47 | 0.37 | 0.35 | 0.41 | 0.37 |

On the contrary, it is quite difficult and also complex to achieve standardization in the processes of multispecialty healthcare institutions and thereby increases the congestion rate beyond the acceptable level of the resources. These characteristics of multispecialty hospitals put HCSP is a difficult and demanding situation which disturbs their absorption of HPWP initiatives for achieving efficiency. HCSP is expected to prioritize achieving effectiveness through HPWP moderated by relational coordination leaving behind efficiency. This is in alignment with past literature that discusses the tradeoff between efficiency and effectiveness in healthcare delivery [5] and our results indicate that is more so for multispecialty healthcare institutions.

Second, our research is unique in attempting to validate the past findings on the impact of HPWP on healthcare institution's effectiveness and efficiency when moderated by relational coordination in an emerging country context. HPWP of Gittell (2010) is modified for this research because job positions like case managers or health administrator positions are absent in healthcare institutions of emerging economies such as India. The main barrier to collaborative practice in the emerging economies is miscommunication and traditional health

care delivery without job roles such as ‘case manager’ [72]. Patients are directly handled and coordinated by a doctor, nurse, nurse assistant, pharmacists, and receptionist in the majority of the cases, thereby many job descriptions in the healthcare institutions in the context of Indian or other emerging economies are highly dynamic in nature. This led us to exclude cross-functional boundary spanners from HPWP. We expect this modification to impact the coordination among front and backend professionals, and thereby influence the moderating relationship of relational coordination between HPWP and efficiency, effectiveness, and overall performance. The extent of influence has left the relationship between HPWP and efficiency moderated by relational coordination insignificant.

An organization, in general, coordinates its functions and departments by relying on two aspects – communication and relationships [73], [74] Communication is assessed by its frequency, timeliness, accuracy, and problem-solving orientation, and relationships are based on shared knowledge, shared goals, and mutual respect [7]. Both these aspects get affected when cross-functional boundary spanners are absent. This in turn significantly affects the coordination of work, conflict resolution, accountability in performance management, rewards, meetings, etc. due to the inability to bring together different work roles [50] into a coherent package for achieving efficiency. The effect is more severe in the healthcare context which demands a high degree of interdependence in work processes that are uncertain and time-constrained [19], [73]. Future research has to delve deeper by adopting qualitative methods to understand when effectiveness and efficiency are prioritized and how HCSP comes together to achieve them.

Several other characteristics of healthcare institutions in the emerging country context can influence the model tested in our research. Difficulty in recruiting and retaining healthcare providers can weaken the sustainable implementation of HPWP and also the maturity of relational coordination which in turn can affect the efficiency and effectiveness of the

healthcare institution. Indian society's collectivistic orientation [75] has an impact on the commitment [76] of HCSP to the acceptance and implementation of HPWP and the moderation role of relational coordination. Exploring the impact of collectivistic culture on HPWP and relational coordination should be an interesting avenue for future research. India has weakly developed governance mechanisms to oversee provider's behavior resulting in overutilization and appropriateness of care issues [77], which can influence the implementation of HPWP and maturity levels of relational coordination. Healthcare-related regulatory structures such as mandatory registration, accreditation, and credentialing of providers, regular service evaluations, and substandard quality control are underdeveloped. There is also wide variation among healthcare institutions (even in the private sector) regarding the availability of equipment, record-keeping, and staffing. These inherent inefficiencies will affect the validity of the empirical model which is worthwhile to explore in future research. In light of these inherent differences, it will be interesting to investigate and compare the impact of HPWP on efficiency and effectiveness across different emerging economies and developed economies using the lens of relational coordination.

Third and final key contribution of this study is the variety of roles in the healthcare institution from which the data have been gathered for testing the empirical model. Past researches have primarily focussed on the frontline of service delivery (which comes into direct patient contact) and the sample consists of physicians, nurses, physical therapists, social workers, and/or case managers (e.g. [15], [22]). Our sample consists of both frontline and backend HCSP including the physician, nurse, nurse assistant, technician, pharmacist, and administration staff. We believe this to be more of an inclusive sample from the healthcare service delivery perspective. In reality, a healthcare institution depends on all these categories of professionals, and accounting for them will make the results realistic and generalizable across. We expect the gathered sample to completely capture the interactions while

implementing HPWP and also explain the total maturity of relational coordination which can impact conflict resolution, accountability in performance management, rewards, meetings, etc. By expanding the sample, relational coordination will encompass inter-functional, inter-departmental, frontline, and backend roles, especially in settings where there is a high degree of interdependence in the work process. This will help in robustly capturing the antecedents and consequences of relational coordination and probably address the broader debates surrounding the prediction links between HPWP and organizational performance [47]. The absence of impact of HPWP on efficiency when moderated by relational coordination in our results have to be explored further from the lens of the tension that can occur between frontline and backend HCSP while introducing interventions such as HPWP.

These findings can improve the measurement systems that further insights researchers about the ways to tackle barriers of collaborative practices in different emerging nations. Using commissioned reports from WHO, Mickan *et al*. found that barriers to collaborative practices of developing countries such as India, Thailand, and Nepal are miscommunication, lack of time, and a traditional system [72]. As this study unveils that relational coordination positively moderates the relation between MHPWP and the overall performance outcome, it is clear that HCSPs in emerging economies can benefit from the learning of this present study. A health manager may implement HPWP practices to improve the performance of a traditional health system in an emerging economy, but without focusing on relational coordination between different representatives of an HCSP i.e. Physicians, nurses, nursing assistants, technicians, pharmacists, and receptionists. Flawed communication due to lack of time in health settings creates miscommunications that serve as a major barrier to a collaborative work environment. Measurement of relational coordination parameters using constructs: shared goal, frequent communication, timely communication, accurate communication, and problem-solving communication, mutual trust, shared knowledge can aid to identify which factor is responsible

for this miscommunication in HCSP promise that serves as the barrier of the collaborative health care system. In a way, integrating our findings and measurement system can aid to delve deeper into the previously reported barriers of collaborative care [72] and a health administrator can realize which parameter of the relational coordination is lacking in a particular HCSP that is hindering collaborative care in the hospital premise.

## 7. Conclusion

Past research has explored how HPWP has been implemented by healthcare institutions to enhance their performance and this relationship is influenced by relational coordination. The majority of this research has focused primarily on single-specialty healthcare institutions in developed countries. Motivated by the inherent characteristics of multi-specialty healthcare institutions and emerging economy context, in this research, we study the impact of high-performance work practices on overall performance, efficiency, and effectiveness of healthcare service delivered by multispecialty hospitals in India and how this linkage is moderated by relational coordination. We analyzed 605 valid responses from different healthcare service providers located in the southern Tamil Nadu state of India using structural equation modeling. In alignment with published research, our results show that high-performance work practices improve the overall performance and effectiveness and this linkage is moderated by relational coordination. However, high-performance work practice's impact on efficiency and its moderation by relational coordination is insignificant. We explain the results obtained by anchoring it to the characteristics of multi-specialty and emerging economy context and discuss the implications for research and practice.

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# Appendix

## Appendix 1: Survey Questionnaire

**Five dimensions of Gittell's Framework (Total 32 Questions)**

**Dimension 1 - Cross-Functional Team Work (CFTW) – 5 Questions**

1. How far teamwork criterion supports health care?
2. To what extent you think the information available in previous health records supports the health care team to do their jobs well?
3. To what extent team experience will be helpful to fix problems if something is so serious?
4. How far does the work you carried out as a team member influences quality outcomes?
5. From your experience how likely you think the workload distribution in a team is fair enough to the individual team member

**Dimension 2 - Cross-Functional Team Reward (CFTR) - 5 Questions**

6. How often do you get a reward for your work based on individual performance?
7. How often do you get a reward for your work based on team performance?
8. The rewards match my work and satisfaction
9. There may be a situation from your experience you might have realized that rewards vary depending upon the team's performance
10. Do you believe the person who suggested the new idea gets rewarded in your Organization?

**Dimension 3 - Cross-functional Team Meetings (CFTM) - 5 Questions**

11. How often have you participated in the cross-functional team meetings conducted by the management?
12. The cross-functional team meetings conducted are effective and helps to achieve our objectives
13. How often have you participated in the cross-functional team meetings conducted by other providers?
14. The team meetings are conducted as per plan and in a planned duration
15. Have you got knowledge enhancement in the cross-functional team meetings?

**Dimension 4 - Cross-Functional Conflict Resolution (CFCR) - 5 Questions**

16. When a problem arose, I have access to formal Conflict resolution process?
17. Team Members help each other during the care of the patients
18. There exists a conflict between care providers inside or outside the department
19. Cross-functional conflict does occur in our organization because of vague communication from top-level management to bottom level management.
20. To what extent do you think the cross-functional conflict will affect the service provided by the care providers?

**Dimension 5 -** Cross Functional Performance Measurement (CFPM) - 12 Questions

21. What kind of relationship cross-functional approach has with patient's length of stay?
22. To what extent the problem-solving approach improves a patient's length of stay
23. How far does the cross-functional team meeting carried out influences a patient's length of stay?
24. How far does the cross-functional rewards to the provider's influences a patient's length of stay?
25. How far does the cross-functional conflict resolution influences the patient's length of stay?
26. How far does the cross-functional teamwork among provider's influences a patient's length of stay?
27. What kind of relationship a cross-functional approach has service quality?
28. To what extent the problem-solving approach improves service quality?
29. How far does the cross-functional team meeting carried out influences service quality?
30. How far do the cross-functional rewards to the provider's influences service quality?
31. How far does the cross-functional conflict resolution influences service quality?
32. How far does the cross-functional teamwork among provider's influences service quality?

**Relational Coordination - 14 Questions**

33. How frequently do you communicate with care providers within your department about out the patients?
34. How frequently do you communicate with care providers outside your department about the patients?
35. Do the care providers within your department communicate with you in a timely way about the patients?
36. Do the care providers outside your department communicate with you in a timely way about the patients?
37. Do the care providers within your department communicate with you accurately about the patients?
38. Do the care providers outside your department communicate with you accurately about the patients?
39. When problems arose regarding the care of the patients, do the care providers within your department work with you to solve the problem?
40. When problems arose regarding the care of the patients, do the care providers outside your department work with you to solve the problem?
41. How much do these care providers within your department respect your role in caring for the patients?
42. How much do these care providers outside your department respect your role in caring for the patients?
43. How much do these care providers within your department share your goals for the care of the patients?

44. How much do these care providers outside your department share your goals for the care of the patients?
45. How much do the care providers within your department know about your role in caring for the patients?
46. How much do the care providers outside your department know about your role in caring for the patients?

**Effectiveness of Care- 5 Questions**

47. To what extent care providers (i.e. Doctor) communicate well the medical instructions clearly?
48. How carefully do these care provider answers to your queries?
49. How far you are satisfied with the duration spent by the care provider?
50. To what extent the care providers pay attention to collect and analyze important patient medical history in detail?
51. To what extent you are pleased with care provider's courtesy and respect during treatment?

**Efficiency of Care - 6 Questions**

52. To what extent you believe the worthiness of treatment with respect to payment?
53. To what extent you believe the worthiness of treatment with respect to facilities?
54. How far you are satisfied with respect to your length of stay in Hospital and recovery?
55. To what extent you think the latest hospital experience is efficient when you compare the service you received in other hospitals
56. To what extent the length to you, stay is important when selecting the hospital for treatment
57. Length of stay details information collected from the concerned hospital